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PATENT APPLICATION

ATTORNEY DOCKET NO. 200310949-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Michael HARVILLE

Confirmation No.: 8918

Application No.: 10/698,111

Examiner: Bernard Krasnic

Filing Date: 10/31/2003

Group Art Unit: 2624

Title: METHOD FOR VISUAL-BASED RECOGNITION OF AN OBJECT

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 08/04/2009 .

☑ The fee for filing this Appeal Brief is $540.00 (37 CFR 41.20).

☐ No Additional Fee Required.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month $130	☐ 2nd Month $490	☐ 3rd Month $1110	☐ 4th Month $1730

☒ The extension fee has already been filed in this application.

☐ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $540 . At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

Respectfully submitted,
Michael HARVILLE

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellant:	Harville	Patent Application	
Application No.:	10/698,111	Group Art Unit:	2624
Filed:	October 31, 2003	Examiner:	Krasnic, Bernard

For: A METHOD FOR VISUAL-BASED RECOGNITION OF AN OBJECT

APPEAL BRIEF

Table of Contents

I. Real Party in Interest

The assignee of the present application is Hewlett-Packard Development Company, L.P.

II. Related Appeals and Interferences

There are no related appeals or interferences known to the Appellant.

III. Status of Claims

Claims 1-40 are pending. Claims 1-7 and 9-39 are rejected. Claims 8 and 40 are objected to. This Appeal involves Claims 1-7 and 9-39.

IV. Status of Amendments

All proposed amendments have been entered. An amendment subsequent to the Final Action has not been filed.

V. Summary of Claimed Subject Matter

Independent Claim 1 recites, "A method for visual-based recognition of an object," which is described, according to various embodiments, at page 24 lines 29 to page 27 line 26, Figures 1A, 3, and 7. "Receiving (710) digital depth data (110) for at least a pixel of an image of an object, which is not required to be inside of a subject, said depth data (110) comprising information relating to a distance from a visual sensor (105, 305) to a portion of said object shown at said pixel, said visual sensor (105, 305) comprising an emitter and sensor of light, wherein said light is selected from the group of electromagnetic radiation consisting of visible light, infrared light, and ultraviolet light and wherein said receiving (710) of said depth data (110) does not require special behavior from one of said object and said subject," is described, according to various embodiments, at Figures 1A, 3, and 7; page 24 line 29 to page 25 line 2. "Generating (730) a plan-view image (165) based in part on said depth data (110), wherein said generating includes generating said plan-view image (165) as if said object were viewed from above and wherein generating other view images based on different orientations of said object other than from above is not required," is described, according to various embodiments, at page 25 line 12 to page 26 line 15; Figures 1A, 3, and 7. "Extracting (740) a plan-view template (125) from said plan-view image (165), wherein at least a portion of said plan-view image (165) is transformed," is described, according to various embodiments, at page 27 lines 1-6; Figures 1A and 7. "Processing (750) said plan-view template (125) at a classifier (130), that is executing on a computer system, to assign a class to said plan-view template (125), wherein said classifier (130) is trained to make a decision (135) according to pre-configured parameters determined at least in part based on said class of said plan-view template (125)," is described, according to various embodiments, at page 27 lines 8-26; Figures 1A and 7.

Independent Claim 23 recites, "A visual-based recognition system," which is described, according to various embodiments, at page 7 line 6 to page 8 line 30; Figures 1A, 1B, 3, and 7. "A visual sensor (105, 305) for capturing (710) depth data (110) for at least a pixel of an image of an object, which is not required to be inside of a subject, said depth data (110) comprising information relating to a distance from said visual sensor (105, 305) to a portion of said object visible at said pixel, said

visual sensor (105, 305) comprising an emitter and sensor of light, wherein said light is selected from the group of electromagnetic radiation consisting of visible light, infrared light, and ultraviolet light and wherein said capturing of said depth data (110) does not require special behavior from one of said object and said subject," is described, according to various embodiments, at page 7 line 6 to page 8 line 30; Figures 1A and 3. "A plan-view image generator (120) for generating (730) a plan-view image (165) based on said depth data (110), wherein said generating (730) of said plan-view image (165) includes generating (730) said plan-view image (165) as if said object were viewed from above and wherein generating other view images based on different orientations of said object other than from above is not required," is described, according to various embodiments, at page 9 line 21 to page 15 line 4; Figures 1A and 1B. "A plan-view template generator (128) for generating (740) a plan-view template (125) based on said plan-view image (165)," is described, according to various embodiments, at page 15 line 20 to page 16 line 3; Figures 1A and 1C. "A classifier (130) for making (750) a decision (135) concerning recognition of said object, wherein said classifier (130) is trained to make said decision (135) according to pre-configured parameters that were determined at least in part based on a class assigned to said plan-view template (125)," is described, according to various embodiments, at page 20 line 5 to page 23 line 23; Figures 1A and 3.

Independent Claim 32 recites "A method for visual-based recognition of an object representative in an image," which is described, according to various embodiments, at page 25 line 15 to page 26 line 30. "Generating (820) a three-dimensional point cloud (330) based on digital depth data (110) for at least a pixel of an image of said object, which is not required to be inside of a subject, said depth data (110) comprising information relating to a distance from a visual sensor (105, 305) to a portion of said object visible at said pixel, said visual sensor (105, 305) comprising an emitter and sensor of light, wherein said light is selected from the group of electromagnetic radiation consisting of visible light, infrared light, and ultraviolet light, said three-dimensional point cloud (330) representing a foreground surface (325) visible to said visual sensor (105, 305) and wherein a pixel of said three-dimensional point cloud (330) comprises a three-dimensional coordinate (440) and wherein said generating (820) of said three-dimensional point cloud (330) does not require special behavior from one of said object and said subject," is described, according to various embodiments, at page 25 lines 24-28; Figures 1A, 3, 4 and 8. "Partitioning (910) said three-dimensional point cloud (330) into a plurality of vertically oriented bins (430)," is described, according to various embodiments, at page 25 line 30 to page 26 line 5; Figures 3, 4, and 9. "Mapping (840) at least a portion of points of said vertically oriented bins (430) into at least one said plan-view image (165) based on said three-dimensional coordinates (440), wherein said plan-view image (165) is a two-dimensional representation (600, 610) of said three-dimensional point cloud (330) comprising at least one pixel corresponding to at least one vertically oriented bin of said plurality of vertically oriented bins (430), wherein said mapping (840) includes generating said plan-view image (165) as if said object were viewed from above," is described, according to various embodiments, at page 26 lines 6-15; Figures 1A, 3, 4, 6, and 8. "Processing (750) said plan-view image (165) at a classifier (130), that is executing on a computer system, wherein said classifier (130) is trained to make a decision (135) according to pre-configured parameters and wherein said pre-configured parameters were determined based at least in part on a class assigned to a plan-view template (125) that was extracted from said plan-view image (165) by transforming at least a portion of said plan-view image (165), said classifier (130) does not require other view images based on different orientations than from above of said object in order to make said decision

(135),” is described, according to various embodiments, at page 27 lines 8-26; Figures 1A and 7.

VI. Grounds of Rejection to Be Reviewed on Appeal

1. Claims 1, 3, 4, 9, 12, 19-23 and 25-26 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Application Publication No. 2002/0050924 by Mahbub et al. (referred to herein as "Mahbub").
2. Claim 6 is rejected under 35 U.S.C. §103(a) as being unpatentable over Mahbub in view of Official Notice.
3. Claims 10, 16, 17 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mahbub in view of U.S. Patent Application Publication No. 2003/0108244 by Li et al. (referred to herein as "Li").
4. Claims 2, 11, 13, 14, 18, 24 and 28 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mahbub in view of U.S. Patent Application Publication 2004/0017929 by Bramblet et al. (referred to herein as "Bramblet").
5. Claims 5, 7, 15, 29-32, 34-37 and 39 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mahbub in view of "Person Counting Using Stereo" 2000 IEEE by Beymer (referred to herein as "Beymer").
6. Claim 33 is rejected under 35 U.S.C. §103(a) as being unpatentable over Mahbub in view of Beymer and further in view of Bramblet.
7. Claim 38 is rejected under 35 U.S.C. §103(a) as being unpatentable over Mahbub in view of Beymer and further in view of Li.

VII. Argument

1. Whether Claims 1, 3, 4, 9, 12, 19-23, and 25-26 Are Anticipated By Mahbub Under 35 U.S.C. 102(b)

Appellant has reviewed the asserted art and respectfully submits that Mahbub does not teach the embodiments recited by Claims of the instant application serial No. 10/698,111 for at least the following rationale.

MAHBUB

This section describes Appellant's understanding of what Mahbub teaches. Referring to the abstract, Mahbub teaches an occupant sensor incorporates a 3-D imaging system that acquires a 3-D image of an object. The application that Mahbub describes for his 3-D imaging system involves a safety restraint system that is controlled based on the presence, position and size of the occupant (last sentence of the abstract). Also referring to the abstract, the image is segmented to remove "unwanted portions" and to identify a region of interest (ROI). Two-dimensional projections are classified and a presence, size and position of an occupant can be identified. The contents thereof are classified based on 3-D features. Referring to 0059, examples of "unwanted portions" referred to in the abstract are the side door, the A-pillar, dashboard, floor and objects outside the window. In order to identify these "unwanted portions," Mahbub takes into account front views (x-y), side views (z-y), and top views (z-x). For example, referring to lines 4-8 of 0088, Mahbub states, "...the projections of the volume on the XY, YZ, and ZX planes- respectively corresponding to the front, side, and top views of the ROI volume respectively shown in FIGS. 13, 12 and 14- are analyzed in 2-D." As a part of determining the presence, position and size of an occupant it is important to be able to detect the seat and to determine whether the seat is empty. For example, referring to paragraph 0068, Mahbub states "For an empty seat, the image comprises a seat cushion (bottom) and a seat back, which can be respectively characterized by two respective planes-a first plane characterizing the seat cushion and a second plan, at an angle relative to the first, characterizing the seat back. Figures 1b and 1c clearly depict that Mahbub uses views from more than one orientation in order to analyze a seat. Since Mahbub requires front views and side views in order to identify the presence, size, and

position of an occupant, Appellant understands Mahbub to require view images that are not from above.

Further, Mahbub states at 0088 "Aside from the modeling shapes of the surfaces, mathematical features are also used for robust classification of features, wherein shape descriptors are applied to the 3-D segmented ROI for volumetric analysis. Further, the projections of the volume on the XY, YZ, and ZX planes—respectively corresponding to the front, side and top views of the ROI volume respectively shown in FIGS. 13, 12 and 14—are analyzed in 2-D. Most of the individual features cannot alone distinguish between scenarios, but may individually distinguish between certain properties of the scenarios. Accordingly, all the features are combined in a feature vector that is formed for an overall classification" (emphasis added). Therefore, Appellant understands Mahbub to teach "classifying" by applying shape descriptors and mathematical equations to a 3-D segmented ROI. Appellant respectfully submits that since Mahbub's 3-D ROI is 3D and therefore is not a plan-view. Second, Appellant respectfully points out that since Mahbub teaches in 0088 a reliance on XY, YZ, and ZX planes and states "Accordingly, all the features are combined in a feature vector that is formed for an overall classification," (emphasis added) where Mahbub relies on all of XY, YZ and ZX planes to determine all of the features, Mahbub requires generating other view images based on different orientations of said object other than from above in order to classify features and combine all of the features to form an overall classification.

DIFFERENCE BETWEEN MAHBUB AND CLAIM 1

This section describes Appellant's understanding of at least some of the differences between what Mahbub teaches and the embodiment recited by independent Claim 1.

MPEP §2131 provides:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... "The identical invention must be shown in as complete

detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim.

As described herein, Appellant understands Mahbub to require views that are not from above in order to determine the presence, position and size of the occupant (last sentence of the abstract). Since Mahbub requires using views from other orientations than from above, Appellant does not understand Mahbub to teach "generating a plan-view image based in part on said depth data, wherein said generating includes generating said plan-view image as if said object were viewed from above and wherein generating other view images based on different orientations of said object other than from above is not required," as recited by independent claim 1.

RESPONSE TO ARGUMENTS SECTION

This section describes Appellant's understanding of why the portions of Mahbub cited in the response to arguments section do not anticipate the embodiments recited by Claim 1. Although any one of ordinary skill in the art understands that a plan-view image is a 2D image of an object "as if the object were viewed from above," Appellant amended the independent Claims 1, 23 and 32 to recite "generating said plan-view image as if said object were viewed from above" in order to expedite prosecution. The Office Action in many places has replaced "plan-view" with "plane-view." As any one of ordinary skill in the art understands a view of an object along a plane, is not the same as a "plan-view" since a "plan-view" is a view of an object "from above."

The Office Action states at lines 8-14 on page 3, "Mahbub is suggesting different location alternatives from where the 3-D image data may be produced and therefore the Examiner is considering Mahbub's plan-view image to be the segmented 3D image from the headliner location [the headliner has a fixed overhead location and a fixed overhead orientation] because the headliner above the rear view mirror which is above the seating area provides the maximum field of view with minimal obstruction." Appellant does not understand either Mahbub's 3D image nor

Mahbub's segments of Mahbub's 3D image to be plan-view images. Mahbub's 3D image does not teach a plan-view image because as any one of ordinary skill in the art understands, a plan-view is 2D not 3D. Appellant respectfully submits that Mahbub's segmented 3D image also does not teach a plan-view image because the segments of the 3D image are also 3D. For example, Mahbub describes "segmentation" of a 3D image at 0059-0066. In the first sentence of 0059, Mahbub states, "As used herein, the term segmentation means the extraction from the image of a region of interest (ROI) that contains useful information. ...the side door, A-pillar, dashed board, floor and objects outside the window are all examples of background clutter that can be and preferably are eliminated from the image by segmentation, leaving as a remainder the ROI." Mahbub uses equations 10, 11, 12, 13 and 14 depicted in paragraphs 0059-0066 to calculate the segments and remove the segments for the A-pillar, dashed board, floor and objects outside the window. Appellant does not understand Mahbub's segments—A-pillar, dashed board, floor and objects—to teach "a plan-view image" for at least the reason that the equations used for calculating the segments involve x, y and z coordinates. Since the equations for calculating the segments involve x, y and z coordinates, the segments are also 3D.

Further, Appellant respectfully submits that the Office Action's statement at lines 8-14 on page 3 confuses the location of a 3D imaging system and "generating" views. For example, referring to 0057 lines 11-14 and 0057 lines 10-12, Mahbub's 3-D imaging system collects 3-D image data (also referred to as "taking 3-D images"). Mahbub generates views of various objects, such as a person in the car, the back of the seat and the bottom of the seat. Mahbub then uses these generated views to identify the presence, size, and position of an occupant. Referring to paragraph 0068, Mahbub requires at least two different views, one of the seat and the other of the seat back, as a part of identifying the presence, size, and position of an occupant. Since Mahbub requires two different views, one of the seat and the other of the seat back, Mahbub does not teach "wherein generating other view images based on different orientations of said object other than from above is not required," as recited by independent Claim 1.

Further, as described herein, Appellant respectfully points out that since Mahbub teaches in 0088 a reliance on XY, YZ, and ZX planes and states "Accordingly, all the features are combined in a feature vector that is formed for an overall classification," Mahbub requires generating other view images based on different orientations of said object other than from above in order to classify features and combine all of the features to form an overall classification. Since Mahbub requires generating other view images, Mahbub does not teach "generating other view images based on different orientations of said object other than from above is not required," as recited by independent Claim 1.

At lines 14-17 on page 3, the Office Action states, "Further, Mahbub's plan-view template [2D XY, YZ, or ZX plane images] which are used for classifying in the other hand are the different projection perspective views of the 3D {ROI} segmented image as discussed in paragraph [0088]. Appellant respectfully submits that if Mahbub's 2D XY, YZ and ZX plane images teach Claim 1's "said plan-view template," then Mahbub should teach assigning a class to Mahbub's XY, YZ, or ZX plane view instead of using his XY, YZ and ZX plane images for classifying. Therefore, Mahbub's different projection perspective views do not teach Claim 1's "said plan-view template."

SUMMARY

For reasons provided herein, Appellant respectfully submits that Mahbub does not teach "generating other view images based on different orientations of said object other than from above is not required," as recited by Claim 1. Therefore, Appellant respectfully submits that Claim 1 should be patentable for at least the reason that Appellant does not understand Mahbub to teach "generating other view images based on different orientations of said object other than from above is not required," as recited by Claim 1.

For similar reasons, independent Claims 23 and 32 should also be patentable since Claim 23 also recites "wherein said generating of said plan-view image includes generating said plan-view image as if said object were viewed from above and wherein generating other view images based on different orientations of said

object other than from above is not required" and Claim 32 recites "...generating said plan-view image as if said object were viewed from above... said classifier does not require other view images based on different orientations than from above of said object in order to make said decision."

Claims 2-22 depend on independent Claim 1. Claims 24-31 depend on independent Claim 23. Claims 33-40 depend on independent Claim 32. These dependent Claims include all of the features of their respective independent claims. Therefore, these dependent claims should be patentable for at least the reasons that their respective independent claims should be patentable.

2. Whether Claim 6 Is Suggested By Mahbub in view of Official Notice Under 35 U.S.C. 103(a)

Appellant has reviewed the asserted art and respectfully submits that the embodiments recited by the Claims of the instant Application are neither taught nor suggested by Mahbub or Li, alone or in combination, for at least the following rational.

"As reiterated by the Supreme Court in *KSR*, the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Obviousness is a question of law based on underlying factual inquiries" including "[a]scertaining the differences between the claimed invention and the prior art" (MPEP 2141(II)). "In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious" (emphasis in original; MPEP 2141.02(I)). Appellant notes that "[t]he prior art reference (or references when combined) need not teach or suggest all the claim limitations, however, Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art" (emphasis added; MPEP 2141(III)).

Appellant respectfully submits that "[i]t is improper to combine references where the references teach away from their combination" (emphasis added; MPEP 2145(X)(D)(2); *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983)). Appellant respectfully notes that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention" (emphasis in original; MPEP 2141.02(VI); *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)). Further, Appellant respectfully submits that, "[w]ith regard to rejections under 35 U.S.C. 103, the examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) is more probable than not" (emphasis added) (MPEP 2142).

More specifically, Appellant understands Mahbub to teach away from the embodiment recited by independent Claim 1. Therefore, there is no motivation to combine Mahbub with any other asserted art.

NO MOTIVATION TO COMBINE

This section describes Appellant's understanding of why there is no motivation to combine Mahbub with any other asserted art because Mahbub teaches away from the embodiment recited by independent Claim 1 for at least the reason that Appellant understands Mahbub to require views that are not from above in order to determine the presence, position and size of the occupant (last sentence of the abstract).

For example, as discussed herein, Appellant understands Mahbub to require two different views, one of the seat and the other of the seat back. Since Mahbub requires two different views, one of the seat and the other of the seat back, Mahbub teaches away from "generating other view images based on different orientations of said object other than from above is not required," as recited by independent Claim 1.

In another example, as described herein, Appellant respectfully points out that since Mahbub teaches in 0088 a reliance on XY, YZ, and ZX planes and states "Accordingly, all the features are combined in a feature vector that is formed for an overall classification," (emphasis added) where Mahbub relies on all of XY, YZ and ZX planes to determine all of the features, Mahbub requires generating other view images based on different orientations of said object other than from above in order to classify features and combine all of the features to form an overall classification. Since Mahbub requires generating other view images, Mahbub teaches away from "generating other view images based on different orientations of said object other than from above is not required," as recited by independent Claim 1.

RESPONSE TO ARGUMENTS SECTION

Appellant respectfully points out that since Mahbub teaches in 0088 a reliance on XY, YZ, and ZX planes and states "Accordingly, all the features are combined in a feature vector that is formed for an overall classification," (emphasis added) where Mahbub relies on all of XY, YZ and ZX planes to determine all of the features, Mahbub requires generating other view images based on different orientations of said object other than from above in order to classify features and combine all of the features to form an overall classification. Since Mahbub requires generating other view images, Mahbub teaches away from "generating other view images based on different orientations of said object other than from above is not required," as recited by independent Claim 1.

SUMMARY

Appellant respectfully submits that Mahbub to teach away from "generating other view images based on different orientations of said object other than from above is not required," as recited by Claim 1. Since Mahbub teaches away from "generating other view images based on different orientations of said object other than from above is not required," there is no motivation to combine Mahbub with any other asserted art. Therefore, Appellant respectfully submits that Claim 1 should be patentable for at least the reason that Appellant understands Mahbub to teach away from "generating other view images based on different orientations of said object other than from above is not required," as recited by Claim 1.

For similar reasons, independent Claims 23 and 32 should also be patentable since Claim 23 also recites "wherein said generating of said plan-view image includes generating said plan-view image as if said object were viewed from above and wherein generating other view images based on different orientations of said object other than from above is not required" and Claim 32 recites "…generating said plan-view image as if said object were viewed from above… said classifier does not require other view images based on different orientations than from above of said object in order to make said decision."

Claims 2-22 depend on independent Claim 1. Claims 24-31 depend on independent Claim 23. Claims 33-40 depend on independent Claim 32. These dependent Claims include all of the features of their respective independent claims. Therefore, these dependent claims should be patentable for at least the reasons that their respective independent claims should be patentable.

3. Whether Claims 10, 16, 17 and 27 Are Suggested By Mahbub in view of Li Under 35 U.S.C. 103(a)

Appellant has reviewed the asserted art and respectfully submits that the embodiments recited by the Claims of the instant Application are neither taught nor suggested by Mahbub or Li, alone or in combination, for at least the reasons already provided herein that there is no motivation to combine Mahbub with any other asserted art because Mahbub teaches away from the embodiments recited by the Claims of the instant Application.

IMPROPER OFFICIAL NOTICE

The foregoing notwithstanding, the instant Office Action states in paragraph 10 on page 10:

> However, Mahbub fails to teach of fairly suggest that the classifier is a support vector machine and that the plan-view template is a vector basis obtained by principle component analysis (PCA).

First, Appellant respectfully points out that Claim 10 was rejected as being unpatentable over Mahbub in view of Li. However, the Office Action did not cite any portion of either Mahbub or Li for "wherein said classifier is a support vector machine," as recited by Claim 10. It appears that the Office Action is taking Official Notice with respect to "wherein said classifier is a support vector machine," as recited by Claim 10.

Second, Appellant respectfully disagrees with the aforementioned assertion regarding the embodiment as recited in Claim 10. As such, Appellant respectfully requests that the Examiner produce authority for this assertion in conjunction with the embodiments as recited in Claim 10 for at least the following rationale.

Appellant respectfully submits that the Examiner has provided inadequate support of a finding of Official Notice. As stated in MPEP § 2144.03(A):

> It would not be appropriate for the examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known. For example, assertions of technical facts in the areas of esoteric technology or specific knowledge of the prior art must always be supported by citation to some reference work recognized as standard in the pertinent art.

See id. (emphasis added), citing In re Ahlert, 424 F.2d at 1091, 165 USPQ at 420-21. Indeed, "[i]t is never appropriate to rely solely on 'common knowledge' in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based." See id., citing Zurko, 258 F.3d at 1385, 59 USPQ2d at 1697 ("[T]he Board cannot simply reach conclusions based on its own understanding or experience-or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings.") (emphasis added).

With respect to the embodiment as recited in Claim 10, Appellant respectfully submits that the basis for the Official Notice, as relied upon in the instant Office Action, is not supported by sufficient evidence of record, as required. Accordingly, Appellant respectfully requests that the Examiner provide adequate evidence in

support of the finding of Official Notice, in accordance with 37 C.F.R. § 104(c)(2) or (d)(2).

4. Whether Claims 2, 11, 13, 14, 18, 24 and 28 Are Suggested By Mahbub in view of Bramblet Under 35 U.S.C. 103(a)

Appellant has reviewed the asserted art and respectfully submits that the embodiments recited by the Claims of the instant Application are neither taught nor suggested by Mahbub or Bramblet, alone or in combination, for at least the reasons already provided herein that there is no motivation to combine Mahbub with any other asserted art because Mahbub teaches away from the embodiments recited by the Claims of the instant Application.

5. Whether Claims 5, 7, 15, 29-32, 34-37 and 39 Are Suggested By Mahbub in view of Beymer Under 35 U.S.C. 103(a)

Appellant has reviewed the asserted art and respectfully submits that the embodiments recited by the Claims of the instant Application are neither taught nor suggested by Mahbub or Beymer, alone or in combination, for at least the reasons already provided herein that there is no motivation to combine Mahbub with any other asserted art because Mahbub teaches away from the embodiments recited by the Claims of the instant Application.

6. Whether Claim 33 is Suggested By Mahbub in view of Beymer, and further in view of Bramblet Under 35 U.S.C. 103(a)

Appellant has reviewed the asserted art and respectfully submits that the embodiments recited by the Claims of the instant Application are neither taught nor suggested by any one or more of Mahbub, Beymer or Bramblet, alone or in combination, for at least the reasons already provided herein that there is no motivation to combine Mahbub with any other asserted art because Mahbub teaches away from the embodiments recited by the Claims of the instant Application.

7. Whether Claim 38 is Suggested By Mahbub in view of Beymer, and further in view of Li Under 35 U.S.C. 103(a)

Appellant has reviewed the asserted art and respectfully submits that the embodiments recited by the Claims of the instant Application are neither taught nor suggested by any one or more of Mahbub, Beymer or Li, alone or in combination, for at least the reasons already provided herein that there is no motivation to combine Mahbub with any other asserted art because Mahbub teaches away from the embodiments recited by the Claims of the instant Application.

Conclusion

Appellant believes that Claims 1, 3, 4, 9, 12, 19-23, and 25-26 are patentable over Mahbub. Appellant believes that Claim 6 is patentable over Mahbub in view of Official Notice. Appellant believes that Claims 10, 16, 17 and 27 are patentable over Mahbub in view of Li. Appellant believes that Claims 2, 11, 13, 14, 18, 24 and 28 are patentable over Mahbub in view of Bramblet. Appellant believes that Claims 5, 7, 15, 29-32, 34-37 and 39 are patentable over Mahbub in view of Beymer. Appellant believes that Claim 33 is patentable over Mahbub in view of Beymer, and further in view of Bramblet. Appellant believes that Claim 38 is patentable over Mahbub in view of Beymer, and further in view of Li.

Appellant respectfully requests that the rejection of Claims 1-7 and 9-39 be reversed. The Appellant wishes to encourage the Examiner or a member of the Board of Patent Appeals to telephone the Appellant's undersigned representative if it is felt that a telephone conference could expedite prosecution.

Respectfully submitted,
Wagner Blecher LLP

Dated: November 4, 2009

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VIII. Appendix - Clean Copy of Claims on Appeal

CLEAN CLAIMS

1. A method for visual-based recognition of an object, said method comprising:

receiving digital depth data for at least a pixel of an image of an object, which is not required to be inside of a subject, said depth data comprising information relating to a distance from a visual sensor to a portion of said object shown at said pixel, said visual sensor comprising an emitter and sensor of light, wherein said light is selected from the group of electromagnetic radiation consisting of visible light, infrared light, and ultraviolet light and wherein said receiving of said depth data does not require special behavior from one of said object and said subject;

generating a plan-view image based in part on said depth data, wherein said generating includes generating said plan-view image as if said object were viewed from above and wherein generating other view images based on different orientations of said object other than from above is not required;

extracting a plan-view template from said plan-view image, wherein at least a portion of said plan-view image is transformed; and

processing said plan-view template at a classifier, that is executing on a computer system, to assign a class to said plan-view template, wherein said classifier is trained to make a decision according to pre-configured parameters determined at least in part based on said class of said plan-view template.

2. The method as recited in Claim 1 further comprising receiving non-depth data for said pixel.

3. The method as recited in Claim 1 wherein said visual sensor determines said depth data using stereopsis based on image correspondences.

4. The method as recited in Claim 1 wherein said generating said plan-view image comprises selecting a subset of said depth data based on foreground segmentation.

5. The method as recited in Claim 1 wherein said generating said plan-view image further comprises:

generating a three-dimensional point cloud of a subset of pixels based on said depth data, wherein a point of said three-dimensional point cloud comprises a three-dimensional coordinate;

partitioning said three-dimensional point cloud into a plurality of vertically oriented bins; and

mapping at least a portion of points of said plurality of vertically oriented bins into at least one said plan-view image based on said three-dimensional coordinates, wherein said plan-view image is a two-dimensional representation of said three-dimensional point cloud comprising at least one pixel corresponding to at least one vertically oriented bin of said plurality of vertically oriented bins.

6. The method as recited in Claim 4 further comprising receiving non-depth data for said pixel, and wherein said foreground segmentation is based at least in part on said non-depth data.

7. The method as recited in Claim 5 further comprising dividing said three-dimensional point cloud into a plurality of slices, and wherein said generating said plan-view image is performed for at least one slice of said plurality of slices.

9. The method as recited in Claim 1 wherein said extracting said plan-view template from said plan-view image is based at least in part on object tracking.

10. The method as recited in Claim 1 wherein said classifier is a support vector machine.

11. The method as recited in Claim 2 wherein said plan-view image is based in part on said non-depth data.

12. The method as recited in Claim 1 wherein said object is a person.

13. The method as recited in Claim 1 wherein said plan-view image comprises a value based at least in part on an estimate of height of a portion of said object above a surface.

14. The method as recited in Claim 1 wherein said plan-view image comprises a value based at least in part on color data for a portion of said object.

15. The method as recited in Claim 1 wherein said plan-view image comprises a value based at least in part on a count of pixels obtained by said visual sensor and associated with said object.

16. The method as recited in Claim 1 wherein said plan-view template is represented in terms of a vector basis.

17. The method as recited in Claim 16 wherein said vector basis is obtained through principal component analysis (PCA).

18. The method as recited in Claim 13 further comprising performing height normalization on said plan-view template.

19. The method as recited in Claim 1 wherein said decision is to distinguish between a human and a non-human.

20. The method as recited in Claim 1 wherein said decision is to distinguish between a plurality of different human body orientations.

21. The method as recited in Claim 1 wherein said decision is to distinguish between a plurality of different human body poses.

22. The method as recited in Claim 1 wherein said decision is to distinguish between a plurality of different classes of people.

23. A visual-based recognition system comprising:

a visual sensor for capturing depth data for at least a pixel of an image of an object, which is not required to be inside of a subject, said depth data comprising information relating to a distance from said visual sensor to a portion of said object visible at said pixel, said visual sensor comprising an emitter and sensor of light, wherein said light is selected from the group of electromagnetic radiation consisting of visible light, infrared light, and ultraviolet light and wherein said capturing of said depth data does not require special behavior from one of said object and said subject;

a plan-view image generator for generating a plan-view image based on said depth data, wherein said generating of said plan-view image includes generating said plan-view image as if said object were viewed from above and wherein generating other view images based on different orientations of said object other than from above is not required;

a plan-view template generator for generating a plan-view template based on said plan-view image; and

a classifier for making a decision concerning recognition of said object, wherein said classifier is trained to make said decision according to pre-configured parameters that were determined at least in part based on a class assigned to said plan-view template.

24. The visual-based recognition system as recited in Claim 23 wherein said visual sensor is also for capturing non-depth data.

25. The visual-based recognition system as recited in Claim 23 wherein said visual sensor determines said depth data using stereopsis based on image correspondences.

26. The visual-based recognition system as recited in Claim 23 wherein said plan-view image generator comprises a pixel subset selector for selecting a subset

of pixels of said image, wherein said pixel subset selector is operable to select said subset of pixels based on foreground segmentation.

27. The visual-based recognition system as recited in Claim 23 wherein said classifier is a support vector machine.

28. The visual-based recognition system as recited in Claim 24 wherein said plan-view image is based in part on said non-depth data.

29. The visual-based recognition system as recited in Claim 23 wherein said plan-view image generator is operable to generate a three-dimensional point cloud based on said depth data, wherein a point of said three-dimensional point cloud comprises a three-dimensional coordinate.

30. The visual-based recognition system as recited in Claim 29 wherein said plan-view image generator is operable to divide said three-dimensional point cloud into a plurality of slices such that a plan-view image may be generated for at least one slice of said plurality of slices.

31. The visual-based recognition system as recited in Claim 30 wherein said plan-view template generator is operable to extract a plan-view template from at least two plan-view images corresponding to different slices of said plurality of slices, wherein said plan-view template comprises a transformation of at least said portion of said plan-view images, such that said plan-view template is processed at said classifier.

32. A method for visual-based recognition of an object representative in an image, said method comprising:

generating a three-dimensional point cloud based on digital depth data for at least a pixel of an image of said object, which is not required to be inside of a subject, said depth data comprising information relating to a distance from a visual sensor to a portion of said object visible at said pixel, said visual sensor comprising an emitter and sensor of light, wherein said light is selected from the group of

electromagnetic radiation consisting of visible light, infrared light, and ultraviolet light, said three-dimensional point cloud representing a foreground surface visible to said visual sensor and wherein a pixel of said three-dimensional point cloud comprises a three-dimensional coordinate and wherein said generating of said three-dimensional point cloud does not require special behavior from one of said object and said subject;

partitioning said three-dimensional point cloud into a plurality of vertically oriented bins;

mapping at least a portion of points of said vertically oriented bins into at least one said plan-view image based on said three-dimensional coordinates, wherein said plan-view image is a two-dimensional representation of said three-dimensional point cloud comprising at least one pixel corresponding to at least one vertically oriented bin of said plurality of vertically oriented bins, wherein said mapping includes generating said plan-view image as if said object were viewed from above; and

processing said plan-view image at a classifier, that is executing on a computer system, wherein said classifier is trained to make a decision according to pre-configured parameters and wherein said pre-configured parameters were determined based at least in part on a class assigned to a plan-view template that was extracted from said plan-view image by transforming at least a portion of said plan-view image, said classifier does not require other view images based on different orientations than from above of said object in order to make said decision.

33. The method as recited in Claim 32 wherein said three-dimensional point cloud and said plan-view image are also based at least in part on non-depth data.

34. The method as recited in Claim 32 wherein said visual sensor determines said depth data using stereopsis based on image correspondences.

35. The method as recited in Claim 32 wherein said plan view template comprises a transformation of at least said portion of said plan view image, and such that said plan-view template is processed at said classifier.

36. The method as recited in Claim 32 further comprising dividing said three-dimensional point cloud of into a plurality of slices, and wherein said mapping at least a portion of points comprises mapping points within a slice of said plurality of slices of said three-dimensional point cloud into said plan-view image.

37. The method as recited in Claim 36 wherein said plan view template comprises a transformation of at least said portion of said plan view image, such that said plan-view template is processed at said classifier.

38. The method as recited in Claim 32 wherein said classifier is a support vector machine.

39. The method as recited in Claim 32 wherein said plan-view image is generated from a subset of pixels of said image selected based on foreground segmentation.

IX. Evidence Appendix

No evidence is herein appended.

X. Related Proceedings Appendix

No related proceedings.